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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/912,652	07/24/2001	Vladimir Segal	30-5004 DIV2	6609

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EXAMINER


WILKINS III, HARRY D

ART UNIT	PAPER NUMBER
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1742

DATE MAILED: 05/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/912,652	Applicant(s) SEGAL ET AL.	
	Examiner Harry D Wilkins, III	Art Unit 1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 March 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935-C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 37-53 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 37-53 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 July 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>12/18, 3/22</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 37-40, 42, 43, 46, 47, 50 and 51 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by “Development of a submicrometer-grained microstructure in aluminum 6061 using equal channel angular extrusion” (*Development*, henceforth) with support from Metals Handbook.

Development anticipates the invention as claimed. *Development* teaches (see second section “Materials and Experimental Procedures”) starting with aluminum alloy billets that have been hot extruded. Billets are ingots that have been subjected to deformation, and ingots are the product of casting, thus, the billets of *Development* are a “cast material” as the material was cast during its production. Next, the alloy is subjected to solution treatment (i.e.-solutionizing). Then the alloy is subjected to a predetermined set of routes of Equal Channel Angular Extrusion (ECAE), which corresponds to the steps of “defining ECAE routes for defining predetermined shear planes and crystallographic directions in the alloy, selecting at least a route from the defined routes for plastically deforming the alloy during ECAE and subjecting the alloy to a predetermined number of passes through the selected routes”.

Extrusion, as defined by the Metals Handbook (page 15), is the plastic deformation of metal by pressing the metal through a die. Forging, as defined by the Metals Handbook (page 18), is the plastic deformation of metal into desired shapes with compressive forces, with or without dies. Thus, extrusion falls under the broad term forging. Hence, the product of *Development* includes both solutionizing and hot forging.

Regarding any additional steps present in the process of *Development*, the present claims recite a method "comprising the steps of", which is read to leave the method open to additional steps, even those which materially change the method.

Regarding claim 38, *Development* teaches (see second column of page 2) that special processing steps were studied, including annealing of the material at 250°C after four passes of ECAE, i.e.-recovery annealing, which would inherently produce a substantially uniform grain size, global microstructure and texture. *Development* teaches hot forging of the cast material.

Regarding claim 39, *Development* teaches (see second column of page 2) that special processing steps were studied, including intermediate annealing at 250°C of the material after four passes of ECAE, followed by additional stages of ECAE and then subjecting the material to final annealing, i.e.-recovery annealing, at temperatures ranging from 90°C to 450°C, i.e.- at a temperature greater than the maximum temperature of the "temperature range". *Development* teaches applying both solutionizing and hot forging.

Regarding claim 40, *Development* teaches (see second column of page 2) that special processing steps were studied, including intermediate annealing at 250°C of the

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material after four passes of ECAE, followed by additional stages of ECAE and then subjecting the material to final annealing, which is a post-extrusion processing to create a specific texture, a uniform grain size and a high texture strength for the alloy.

Development teaches applying hot forging.

Regarding claim 42, *Development* teaches (see second column of page 2) subjecting the material to intermediate annealing between at least some of the passes.

Regarding claim 43, the intermediate annealing of *Development* is at 250°C (see second column of page 2), which is below the beginning stages static recrystallization, i.e.-recovery annealing.

Regarding claim 46, *Development* teaches (see second column of page 2) subjecting the material to annealing after 4 passes.

Regarding claim 47, the annealing of *Development* is at 250°C (see second column of page 2), which is below the beginning stages static recrystallization, i.e.-recovery annealing.

Regarding claim 50, the intermediate annealing of *Development* is at 250°C (see second column of page 2), which is below the beginning stages static recrystallization, i.e.-recovery annealing.

Regarding claim 51, the annealing of *Development* is at 250°C (see second column of page 2), which is below the beginning stages static recrystallization, i.e.-recovery annealing.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 44, 45, 48 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Development* in view of "Stress-Relief Heat Treating of Steel".

Development teaches, as above in paragraph no. 3, performing the intermediate and/or post-extrusion annealing as a recovery annealing, i.e.-below the beginning stages of static recrystallization, thus, failing to meet the claimed limitations.

However, "Stress-Relief Heat Treating of Steel" teaches (see page 33, 1st column) that a heat treatment is applied to workpieces that have developed residual stresses in order to relieve the stresses thereby reducing distortion and preventing stress-corrosion cracking. "Stress-Relief Heat Treating of Steel" teach (see page 33, 2nd column) that residual stresses develop during rolling, casting, forging, bending, drawing or machining. Therefore, one of ordinary skill in the art would have expected the material of *Development* to have residual stresses due to the amount of deformation caused by the ECAE. "Stress-relief treatment" and "recovery annealing" are synonyms. (Though "Stress-Relief Heat Treating of Steel" is related to a ferrous metal, the same general metallurgical principles hold true for other non-ferrous alloys, such as aluminum.) Time and temperature were known to be result effective variables (see "Stress-Relief Heat Treating of Steel" at page 33, 3rd column), therefore, it would

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have been obvious to one of ordinary skill in the art to have optimized these process parameters to achieve the proper relief of stresses.

Therefore, it would have been obvious to one of ordinary skill in the art to have applied the intermediate stress-relief treatment of *Development* at a higher temperature, such as at a temperature corresponding to the beginning temperature of full static recrystallization or at a temperature at or above the temperature of full static recrystallization, because the stress-relief treatment reduces stresses that cause brittle fracture during further cold working (for support see page 33, 1st column of "Stress-Relief Heat Treating of Steel").

5. Claims 41, 52 and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Development* in view of Segal (US 5,513,512).

The teachings of *Development* are described above in paragraph no. 3. *Development* teaches applying both solutionizing and hot forging.

However, *Development* does not teach a further ECAE processing step to create a specific texture, a uniform grain size and a high texture strength for the alloy.

However, because Segal teaches how to determine the final texture and grain size of the alloy when subjecting the alloy to ECAE, one of ordinary skill in the art would have expected that the process of ECAE creates the desired texture, uniform grain size and texture strength for the alloy.

Therefore, it would have been obvious to one of ordinary skill in the art that the last ECAE of *Development* would create the desired texture, uniform grain size and texture strength for the alloy as claimed.

Regarding claims 52 and 53, *Development* teaches (see second column of page 2) performing both intermediate recovery annealing and post-extrusion recovery annealing.

Response to Arguments

6. Applicant's arguments filed 22 March 2004 have been fully considered but they are not persuasive. Applicant has argued that *Development* does not teach the presently claimed limitations requiring more than one of solutionizing, homogenizing and hot forging.

In response, as there is no specific definition given in the specification for hot forging in the present specification, the Examiner has gone to the Metals Handbook for the normal definition of the term is in the art. Upon reviewing both the definition of forging and extrusion, it is the Examiner's opinion that the broad term "hot forging" includes within its scope "hot extrusion". Therefore, *Development* meets all of the claim limitations of the present claims..

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D Wilkins, III whose telephone number is 571-272-1251. The examiner can normally be reached on M-Th 10:00am-8:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Harry D Wilkins, III
Examiner
Art Unit 1742

hdw

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SUPERVISORY PATENT EXAMINER
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